

DETERMINING THE MARKET LEADER OF CELLULAR PHONE USING ANALYTICAL HIERARCHY PROCESS (AHP) AT SMARTPHONE ANDROID IN MANADO

by:
Fandy F. Kondoy¹

¹Faculty of Economics and Business,
International Business Administration (IBA) Program
University of Sam Ratulangi Manado

email: ¹fandy_kondoy@yahoo.com

ABSTRACT

The cellular-phone market in Manado is fairly competitive. Two of the most well-known are Samsung and Sony. The cell phone has influenced society and culture in ways that make life easier and more controllable. The objectives of this research are to identify the market leader of cellular phone in Manado using Analytical Hierarchy Process, and to analyze the key strengths of each cellular phone brand. To achieve these objectives, expert opinions are analyzed as data. These data are analyzed by using analytical hierarchy process. Theories supporting this research are marketing, market, market leader, and marketing mix. The population in this research is people who use this two of cellphone (Samsung and Sony) with sample as many as 100 respondents. Result and conclusion are Samsung is the market leader of cellular-phone market in Manado since it got the highest average weight during the result of analyzes and computation of expert opinion. In the future, Samsung needs to improve their product innovation and technology to maintain their position as a market leader, because cellular-phone competition is really tight. Samsung smartphone products are more common for people in the Manado City, compared with the similar ones for Sony. And finally, Samsung became the Market Leader for the cellular phone in Manado city for a certain period.

Keywords: *market leader, cellular phone*

INTRODUCTION

Research Background

Telecommunications become the part of life in today's societies. Communication among people in a country or overseas supported by many communication devices that grow rapidly in this period. With the invention of the telephone, society begin to depend on quicker ways of communication with others. Higher expectations for quicker communications were initially met by using short-range radio systems for use in emergency vehicles. However, even higher portability was realized with miniaturization of components. This demand for a new product led to the invention of the cellular-phone. It, also known as mobile-phone, smart phone, mobile or hand-phone is an electronic communications device with the same basic capability as a conventional fixed line telephone, but which is also entirely portable and is not required to be connected with a wire to the telephone network.

Cellular-phones are often packed with features that offer users for more than just the capability to send text messages and make voice calls. These may include internet browsing, music (MP3) playback, personal organizers, email, watch/alarm, built-in cameras, ring-tones, security measures (e.g. pin codes), SIM blocks, games, radio, Push to talk, infrared and blue-tooth connectivity, and call registers. In many countries, mobile phones now outnumber land-line telephones, with most adults and many children now owning mobile phones. It is not uncommon for young adults to simply own a mobile phone instead of a land-line for their residence. In some developing countries, where there is little existing fixed-line infrastructure, the mobile phone has become widespread. With high levels of mobile telephone penetration, a mobile culture has evolved, where the phone becomes a key social tool, and people rely on their mobile phone address-book to keep in touch with their friends and relatives. The mobile phone itself has also become a totemic and fashion object, with user's decorating, customizing, and accessorizing their mobile phones to reflect their personality.

Indonesia's telecommunication sector is a highly competitive, rapidly changing and dynamic industry that has come to reflect significant shifts in social behavior and interaction. The cellular phone sector continued to grow at a dramatic pace. This youthful market base has grown up being accustomed to using mobile telephones as their main communication device which has made the market highly receptive to the latest trends in netbook and tablet computers thereby creating a new realm of competition for devices, data and roaming packages.

Some of the world's largest mobile phone manufacturers include Samsung and Sony are available in Indonesia, especially in Manado market. Cellular-phones with platform by android operation system are now widely used, with the majority of the adult, teenage, and even child population owning one. Number of Cellular-phone owned by Manado society is increasing, and predicted can over-come number of land-line telephones if it's not limited by provider's coverage area. People in Manado also become mobile, due to their activities and business. Mobility represents more than movement because it encompasses all lifestyles, all industries, all forms of media, and myriad environments. It affects, and is affected by, all facets of society life: culture, education, work, play, and even reshaping the way in which to interact with one another in the world. Cellular-phones market is very tight and crowded since every manufacturer in three or four months usually launched new product with improved innovation and technology to the market.

Research Objectives

The specific objectives of this research are:

1. To identify the brand of cellular phone (Samsung or Sony) that becomes the market leader in Manado by using Analytical Hierarchy Process.
2. To analyze the key strengths of each cellular phone brand

THEORITICAL FRAMEWORK

Theories

Marketing

Burns and Bush (2006:4) defined marketing as an organization function, not a group of persons or separate entity within the firm. Kotler and Keller (2009:45) stated that Marketing is about identifying and meeting human and social needs. One of the shortest good definitions of marketing is "meeting needs profitability". Marketing has been defined as an organizational function and a set of processes for creating, communicating, and delivering value to customers and for managing customer relationships in way that benefit the organization and its stakeholder. Thus, Marketing Management as the art and science of choosing target markets and getting, keeping, and growing customers through creating, delivering, and communicating superior customer value.

Market

Kotler (2006:10) stated that a market is the set of actual and potential buyers of a product. These buyers share a particular need or want that can be satisfied through exchanged relationships. The size of market depends on the number of people who exhibit the need, have resources to engage in exchange, and are willing to exchange the resources for what they want. Originally the term market stood for the place where buyers and sellers gathered to exchange their goods, such as a village square. Economists use the term market to refer to a collection of buyers and sellers who transact in a particular product class, as in the housing market or the grain market. It concluded market as:

1. A public gathering held for buying and selling merchandise.
2. A place where goods are offered for sale.
3. A store or shop that sells a particular type of merchandise:

In marketing, the term *market* refers to the group of consumers or organizations that is interested in the product, has the resources to purchase the product, and is permitted by law and other regulations to acquire the product. The market definition begins with the total population and progressively narrows.

Market Leader

The market leader is dominant in its industry. It has substantial market share and often extensive distribution arrangements with retailers. It typically is the industry leader in developing innovative new business models and new products (although not always). The leaders has the largest market share and usually leads the other firms in price changes, new-product introductions, distribution coverage and promotion spending.

Marketing Mix

Solomon and Stuart (2000:9) cited that marketing's tool is the marketing mix. The marketers' strategic tool box is called the marketing mix, which consist of the tools that are used together to create a desired response among a set of pre-defined customers. Zikmund and D'Amico (1999:10) stated that marketing mix is the specific combination of interrelated and interdependent marketing activities in which an organization engages to meet its objectives. Kotler and Amstrong (2004:56) stated that Marketing Mix is the set of controllable tactical marketing tools that the firms to produce the response it wants in the target market.

Previous Research

Husso (2011) examined competition in the mobile phone markets of the United States and Europe in light of interviews and secondary data covering years 2002 - 2011. The findings reveal that the U.S. and European mobile phone markets are fundamentally different. Chan et al. (2006) showed the research report details cell phone industry analysis, which deals with cell phone manufacturers as well as cell phone services. This analysis includes the dominant economic characteristics, Six Forces of Competition (Porter's Five Forces of Competition), driving forces of the cell phone industry, strategic mapping of company strengths, the ease entry and exit into the cell phone industry, and the overall industry outlook. Chang and Wang (2008) examined that since the liberalization of the telecommunications industry in Mainland China during the early 1980's, the mobile phone industry has seen significant development, registering huge increases in the number of users & manufacturers, and in production capacity.

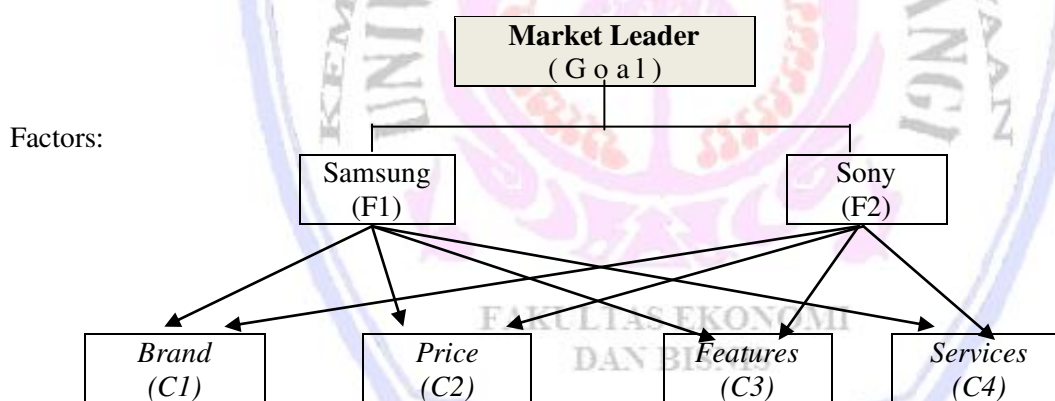


Figure 1. Conceptual Framework

Source: Theoretical Review

RESEARCH METHOD

Type of Research

This research uses quantitative type of research where it will investigate or describe the market leader among cellular phone in Manado market area using Analytical Hierarchy Process (AHP) with case study: smartphone android. Quantitative method uses in this research by interviewing and run the questioner for the main source.

Place and Time of Research

The study was conducted in Manado between Octobers – December 2013.

Population and Sample

Population is a group of knowledgeable people, and sample is a relatively small subset of population. The population in this research is the entire owner of cellular phone shop, technician and user of cellular phone. Samples are experts in mobile phone; they will discuss about the criteria and compare them toward some mobile phone brand. Sample is taking 100 of respondent of users of cellular phone.

Data Collection Method

Sources of Data in this research consist of primary and secondary data. The primary sources (data) are collected from expert opinion and by interviewing them. The expert in this research are those who works in mobile phone distribution as the owner of some cellular-phone shop in Manado, cellular-phone technicians and user who usually change their type or brand of mobile phone and also follow the trend of this product. The expert discusses about the criteria and ranked it compare toward other cellular-phone brand that analyzed. The secondary sources were gathered from books and all relevant articles from the library and Internet

Data Analysis Method

Analytic Hierarchy Process

The Analytic Hierarchy Process (AHP) is a mathematical technique for multi-criteria decision making (Saaty 1994). It enables people to make decisions involving many kinds of concerns including planning, setting priorities, selecting the best among a number of alternatives, and allocating resources. The Analytic Hierarchy Process (AHP) is a powerful and flexible decision making process to help people set priorities and make the best decision when both qualitative and quantitative aspects of a decision need to be considered. By reducing complex decisions to a series of one-on-one comparisons, then synthesizing the results, AHP not only helps decision makers arrive at the best decision, but also provides a clear rationale that it is the best.

We conduct AHP in three steps:

1. Perform pairwise comparisons
AHP enables a person to make pairwise comparisons of importance between decision elements (e.g., *child indicators* influencing a parent indicator, *evaluators* evaluating a leaf indicator) with respect to the preference scale
2. Compute the relative weights
AHP computes a weight for each decision element based on the pairwise comparisons using mathematical techniques such as Eigenvalue, Mean Transformation, or Row Geometric Mean. We employ the Eigenvalue technique for computing the weights under AHP
3. Assess consistency of pairwise judgments
In AHP, before computing the weights based on pairwise judgments, the degree of inconsistency is measured by the Inconsistency Index (II). Perfect consistency implies a value of zero for II. However, perfect consistency cannot be demanded since, as human beings, we are often biased and inconsistent in our subjective judgments.

Operational Definition and Measurement of Research Variables

1. The first step in AHP is to ignore the other factors and the way to reach each objective and evaluation criteria, just decide the relative importance of the criteria by comparing each pair of criteria and ranking them on the following scale.

Factors: A. Samsung
B. Sony

Criteria:

1. Brand

The launched of new product innovation continuously following the trend, lifestyle and customer wants. With the specific of newest technology and easy to use or user friendly

2. Price

Price consideration among the cellular-phone brand for middle-to-upper class in line with the facilities, innovation and technology offered by the cellular-phone manufacturer. *Affordable* and *reasonable* price as a considering.

3. Features : Menu

Number of various menus in cellular shop due to the functional advantages for cellular-phone user. Included; Services Menu, Display, Connectivity, Operating System, and Capacity of Storage.

4. Services

Concern to available number of service center and easiness to get the accessories of cellular-phone. Facilities to get info and how to upgrading the system of cellular phone

2. Labelling all the objectives in one row and column of the matrix
3. Comparing objective i and objective j (where i is assumed to be at least as important as j), give a value " ij " as follows:

Tabel 1. Pairwise Comparison Value

Preference Level	Numerical Value
Equally preferred	1
Equally to moderately preferred	2
Moderately preferred	3
Moderately to strongly preferred	4
Strongly preferred	5
Strongly to very strongly preferred	6
Very strongly preferred	7
Very strongly to extremely preferred	8
Extremely preferred	9

Source: Processed Data, 2013

4. The columns are summed
5. Each " ij " is converted to a percentage of its column total
6. The rows are averaged
7. The average of this row determine the priority for corresponding the objectives. The higher the average, the more important the objective is.

RESULT AND DISCUSSION**Result****1. Result of the Overall Criterion****Table 2. Criterion Priority Value of the Overall Criterion**

Brand	Price	Features	Services
0.240981342	0.100550463	0.300388295	0.358079900

Source: Processed Data, 2013

Table 2. shows that Services has the highest influence to the market for both smartphone companies; Features has the higher influence than Price and Brand, but lower than Services, related with the market for both smartphone companies; Brand has the higher influence than Price, but lower than Services and Features, related with the market for both smartphone companies; and Price has the lowest influence to the market for both smartphone companies.

2. Result of the Sub. Criterion in Brand**Table 3. Criterion Priority Value of the Sub. Criterion in Brand**

	Innovation	Lifestyle	Technology	User Friendly
	0.157463779	0.355363399	0.235956096	0.251216727
Samsung	0.500770119	0.501940994	0.500384615	0.501157407
Sony	0.499229881	0.498059006	0.499615385	0.498842593

Source: Processed Data, 2013

Table 3 shows that Lifestyle has the highest influence to the market for both smartphone companies; User Friendly has the higher influence than Innovation and Technology, but lower than Lifestyle, related with the market for both smartphone companies; Technology has the higher influence than Innovation, but lower than Lifestyle and User Friendly, related with the market for both smartphone companies; and Innovation has the lowest influence to the market of both smartphone companies. Finally, the market of Samsung has been mostly influenced than the market of Sony in Manado.

3. Result of the Sub. Criterion in Price

Table 4. Criterion Priority Value of the Sub. Criterion in Price

	Affordable	Reasonable
	0.497660819	0.502339181
Samsung	0.502742947	0.503571429
Sony	0.497257053	0.496428571

Source: Processed Data, 2013.

Table 4 shows that Reasonable has the highest influence to the market for both smartphone companies and Affordable has the lowest influence to the market for both smartphone companies. Finally, the market of Samsung has been mostly influenced than the market of Sony in Manado.

4. Result of the Sub. Criterion in Features

Table 5. Criterion Priority Value of the Sub. Criterion in Features

	Service Menu	Display	Connectivity	Operating System	Storage
	0.250282905	0.13383067	0.188880969	0.253750894	0.173254562
Samsung	0.501547389	0.500384615	0.501940994	0.500770119	0.503998401
Sony	0.498452611	0.499615385	0.498059006	0.499229881	0.496001599

Source: Processed Data, 2013

Table 5 shows that Operating System has the highest influence to the market for both smartphone companies; Service Menu has the higher influence than Display, Storage and Connectivity, but lower than Operating System, related with the market for both smartphone companies; Connectivity has the higher influence than Display and Storage, but lower than Operating System and Service Menu, related with the market for both smartphone companies; Storage has the higher influence than Display, but lower than Operating System, Service Menu and Connectivity, related with the market for both smartphone companies; and Display has the lowest influence to the market for both smartphones companies. Finally, the market of Samsung has been mostly influenced than the market of Sony in Manado.

5. Result of the Sub. Criterion in Services

Table 6. Criterion Priority Value of the Sub. Criterion in Services

	Accessories	Services Center	Upgrading System	Facilities
	0.245998372	0.338996425	0.299592488	0.115412714
Samsung	0.504687500	0.500384615	0.500770119	0.501940994
Sony	0.495312500	0.499615385	0.499229881	0.498059006

Source: Processed Data, 2013.

Table 6 shows that Service Center has the highest influence to the market for both smartphone companies; Upgrading System has the higher influence than Facilities and Accessories, but lower than Service Center, related with the market for both smartphone companies; Accessories has the higher influence than Facilities, but lower than Service Center and Upgrading System, related with the market for both smartphone companies; and Facilities has the lowest influence to the market both smartphone companies. Finally, the market of Samsung has been mostly influenced than the market of Sony in Manado.

Discussion

Regarding with the common usage of smartphone by many people, there are four main criterion that are considered before using this type of cellular phone, which are Brand, Price, Features, and Services. Thus, each important criterion has been formed by different sub-Criterion. Brand is established by Innovation, Lifestyle, Technology and User Friendly; Price is established by Affordable and Reasonable; Features is established by Service Menu, Display, Connectivity, Operating System and Storage; and Services is established by Accessories, Service Center, Upgrading System and Facilities.

In one developed city in Indonesia, which the Manado City, there are two respected vendors for smartphone, Samsung and Sony. Because of the common usage of this type of cellular phone in this city, the understanding for Brand, Price, Features, and Services and the followed sub-criterion is essentially vital for ensuring the sales volume from each smartphone unit. In this current research, it is found that Services Criterion gives the most significant impact to the market for smartphones companies from Samsung and Sony in this city, while Features and Brand Criteria have the moderate influence and Price Criterion has the least significant impact to the same concept. These findings are related with three reasons. First, many people normally want to use smartphone, especially for cellular phone units, with the services contents that sufficient with their needs and wants. Second, the similarity in installed and extended features and brand understanding for this type of products, from users' point of view do not really differ the preference to use smartphone devices, especially from Samsung and Sony. Third, the pretty or the expensive price from every sophisticated cellular phone, especially smartphone unit, makes many people do not really consider this criterion as the important factor when choosing smartphone units.

Next, the partial result in this research has determined about the influence from four Subs – Criteria in the Brand Criterion to the market for smartphones companies in this research, which are Samsung and Sony. Based on result for this Criterion, it is determined the most dominant impact from Lifestyle to the changing of the market for both smartphones companies in this research. Hawkins *et al.* (1998:433) described lifestyle as how people live. It is determined by people past experiences, innate characteristics, and current situation. It influences all aspect of people's consumption behaviour. The adequate impact from User Friendly and Technology Sub – Criteria to the changing of the market for smartphones companies from Samsung and Sony, and the slightest impact from Innovation Sub – Criterion to any change from the market for smartphones companies in this research, Samsung and Sony. Lipsey *et al* (1993:206) noticed that invention is the discovery of something new, such as a production technique or a product. Innovation is the introduction of an invention into methods of production. Invention is thus precondition to innovation. It is costly and very risky activity engaged by firms in the hope of gaining profits; it results from responses to signals of current and expected prices and cost, that is responses to profit incentives.

To be put in simple, this research's finding had explained that the Reasonable Sub – Criterion in the Price Criterion has the most significant effect for the changing of the market for both smartphones companies in this research, which are Samsung and Sony; and the remained Sub – Criterion in this Criterion, which is Affordable Sub – Criterion, only gives the least significant impact for the same understanding. Both statements are related with the fact that many people want to use the good/best products or services without more consideration in the price and there is diversity in the total income that is obtained by each individual person.

For Features Criterion that are analyzed in this study, it is found out that Operating System Sub – Criterion has become the most influenced Criterion for the changing of the market for both observed smartphones companies in this research; Service Menu, Connectivity and Storage Sub – Criteria give the reasonable impact to any improvement or declining of the market for both smartphones companies in this research, Samsung and Sony; and the least influence from Display Sub – Criterion to the changing of the market for analyzed smartphones companies. Thus, these notes are associated with followed explanations. The first explanation is correlated with the fact that the observed criterion are primarily considered by many people before choosing the suitable smartphone for the. The second explanation is correlated with the idea that these three criteria can be differently concerned by people when choosing and using smartphone. The third explanation is correlated with the comparable or the same display that can be experienced by people when using a sophisticated cellular phone, particularly a smartphone unit. Regarding with the understanding of Services Criterion, the finding in this research has found that Service Center Sub – Criterion has the most significant influence to the market for both smartphones companies in this research, which are Samsung and Sony; the

adequate effect from Upgrading System and Accessories Sub – Criteria from the changing of the market for analyzed smartphones companies, Samsung and Sony; and Facilities Sub – Criterion only give the least significant influence to the market for both smartphones companies, which are Samsung and Sony. All the findings are based on three causes. The first cause is related with the point that the existence of service center is important for many people, either for checking the condition of their cellular phone units or for repairing the error devices. The second cause is related with the perception that both criteria can be differently considered by many people when using cellular phone, particularly, smartphone units. The third cause is related with the infrequent usage of supported facilities that are related with the use of a sophisticated smartphone by many people.

The last finding in this research has found that four Sub – Criterion in Brand Criterion (Innovation, Lifestyle, Technology and User Friendly), two Sub – Criterion in Price Criterion (Affordable and Reasonable), five Sub – Criterion in Features Criterion (Service Menu, Display, Connectivity, Operating System and Storage), and four Sub – Criterion in Services (Accessories, Service Center, Upgrading System and Facilities) give the most significant influence for market of Samsung and the least significant influence for market of Sony. This diversity is based on the dissimilar usage of both smartphone products, in which Samsung smartphone products are more common for people in the Manado City, compared with the similar ones for Sony. And finally, Samsung became the Market Leader for the cellular phone in Manado city for a certain period

CONCLUSION AND RECOMMENDATION

Conclusion

There are three important findings that can be concluded from the overall result in this research, which are listed as follow:

1. Services Criteria has the highest influence; Features Criteria has the higher influence than Price and Brand Criteria, but lower than Services Criteria; Brand Criteria has the higher influence than Price Criteria, but lower than Services and Features Criteria; and Price Criteria has the lowest influence, related with market for cellular phone companies in this research, Samsung and Sony, that give the most significant influence for Market of Samsung and the least significant influence for Market of Sony.
2. Samsung smartphone products have more significant influence to customer perception than Sony smartphone products. Based on Services, Features, Brand, and Price criterion of this research. It affects their market. So, Samsung are more common for people in the Manado City, compared with the similar ones for Sony.
3. Brand's Criteria (Innovation, Lifestyle, Technology and User Friendly), Price's Criteria (Affordable and Reasonable), Features' Criteria (Service Menu, Display, Connectivity, Operating System and Storage), and Services' Criteria (Accessories, Service Center, Upgrading System and Facilities) give the most significant influence for Market Leader of Samsung and the least significant influence for Market of Sony.

Recommendation

There are three constructive recommendations that can be concluded from the overall result in this research, which are listed as follow:

1. The representative management of Samsung and Sony must be concerned about the general acceptance for Brand, Price, Features, and Services for each sold good, to guarantee the balance and the increasing of the sales volume from each cellphone in the Manado City, in the future.
2. The representative management of Samsung and Sony must be also aware about the factual perspectives of elements in every described sub-category for each sold product, to make sure that many potential customers in the Manado City will purchase cellphone from both analyzed companies in this research.
3. The representative management of Samsung and Sony must review the current perception of all the categories and sub-categories for each sold product, to ensure that all those factors can give the similar or even same influence for the existence of each brand in Manado.

REFERENCES

- Burns, A.C., and Bush, R.F. 2006. *Marketing Research*. Prentice Hall, New Jersey.
- Ceteora, P., and Graham, J. 2003. *International Marketing* 11th edition, McGraw-Hill.
- Chan, J., Chen, Z., Cormane, I., Her, N., and Thomas, R. 2006. *Cellphone Industry Analysis*. www.csus.edu/indiv/h/hattonl/industryanalysis.doc. Accessed on December 14th 2013.
- Chang, C.Y., and Wang, F.H. 2008. *Analysis of Strategies for the Mainland China Mobile Phone Industry*. International Journal of Electronic Business Management. http://ije_bm.ie.nthu.edu.tw/IJEBM_Web/IJEBM_static/Paper-V6_N2/A04.pdf. Vol. 6, No. 2. Accessed on December 14th 2013. Pp. 93-98.
- David, F.R. 2003. *Strategic Management* 9th edition: Prentice Hall, New Jersey.
- Duncan, T. *Integrated Marketing Communication*: International edition, McGraw-Hill.
- Ebert, R.J., and Griffin, R.W. 2003. *Business Essential*. Prentice Hall, PTR.
- Evans, J.R., and Berman, B. 1997. *Marketing* 7th Edition. Prentice-Hall International, Inc.
- Hawkins, D.I., Best, R.J, and Coney, K.A. 1998. *Consumer Behavior Building Marketing Strategy* 7th Edition, McGraw-Hill.
- Husso, M. 2011. *Analysis of Competition in the Mobile Phone Markets of the United States and Europe*. International Journal of Department of Management and International Business. http://epub.lib.aalto.fi/en/ethesis/pdf/12638/hse_ethesis_12638.pdf. Accessed on December 14th 2013. Pp. 1-112
- Kotler, P., and Armstrong, G. 2006. *Principles of Marketing*. Prentice Hall, New Jersey.
- Kotler, P., and Keller, K.L. 2009. *Marketing Management* 13th Edition. Prentice Hall, New Jersey.
- Lipsey, G.R., Courant, N.P., Purvis, D.D, and Steines, O.P. 1993. *Economics* 10th edition, Harper Collins, Dunfermline, FIF, United Kingdom
- Saaty, T.L. *Decision making; Mathematical models*. 1994. RWS Publications, Pittsburg.
- Solomon, M.R., and Stuart, E.W. 2000. *Marketing: Real People, Real Choices*. Prentice Hall, California
- Taylor, W. B. 2001. *Management Science* 7th edition. Prentice Hall, Garland, U.S.A.
- Zikmund, W.G., and D'Amico, M. 1999. *Marketing* 6th Edition. South-Western College Publishing.